

**Description of
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Description contact-sensitive indication with tactile feedback the invention relates to a contact-sensitive indicator with tactile feedback.

Contact-sensitive indicators " Touchscreens " come < RTI ID=1.1> überwie < /RTI> gend in so-called Touchscreen terminals to inset, which become operated by means of finger contact of the screen by a user, whereby the keyboard and mouse well-known of the PC are usually void.

A confirmation that one of a user < RTI ID=1.2> getätigten< /RTI> Inputs took place, generally via audiovisual feedback one reaches, for example via a beep or a color change of the normal range when affecting the indicator.

Touchscreen terminals are set up on sensing, presentations or in the reception range of an enterprise to the dialogue with customers. Likewise Touchscreen terminals find also use on airports, in city centres as information terminal for tourists and in manufacturing plants for collection and control of Produktionsabläufen.

A disadvantage with the uses specified last are read and irregularly arising ambient noise, those at airports, lines and/or. Given, thus that the danger it exists manufacturing plants that a auditive feedback by the Um< RTI ID=1.3> gebungsgeräusche< /RTI> are overlaid and to remain unnoticed by the user.

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A visual feedback depends likewise on enviromental influences. For example direct or reflected sunbeams can lead to irritations, so that a visual feedback does not obtain its effect. Besides it also occurs that the user for the visual feedback covers planned ranges of the indicator by the hand.

From US 4.885.565 in addition a contact-sensitive monitor is well-known, with which with one via contact took place input of a user a tactile feedback is released, whereby in addition a moving coil is headed for in such a manner by a microprocessor the fact that it releases a mechanical impulse, which shifts the casing of the monitor in vibration, so that additionally for the audiovisual feedback of the users also feels that its input was detected.

Unfavorably with this solution that all the same which input took place via contact always the same tactile Rckkopplung took place and only via the connection with the still existing audiovisual feedback a Diffe< RTI ID=2.1> renzierung< /RTI> is possible.

Those the invention underlying task is to be indicated it a touch-sensitive indicator as tactile feedback, which solves the disadvantages of the state of the art.

This task is solved by the features of the claim 1.

A contact-sensitive indicator with tactile feedback according to invention points a first mechanical flexible coating, in such a manner out-arranged that it as indicator functioned for example one as electronic paper well-known film, a second coating exhibiting at least one receptor, a third coating exhibiting at least a controllable actuator, whereby the second coating is in such a manner arranged that the receptor a contact in at least a subrange of the first coating under production at least a first signal seized and whereby the third coating is in such a manner arranged that as well as the controllable actuator manipulates the first coating at least in the subrange punctually mechanical control equipment, which is with the second and third coating in such a manner out-arranged and connected that in a Aus< RTI ID=3.1> gangszustand< /RTI> at least a second signal is produced for the control of the actuator, whereby on basis of the first signal at least a changed second signal is produced.

The indicator according to invention makes a seizing for a contact possible of the indicator by the receptor, whereby at the place a tactile feedback is given to the contact directly, in for example with a virtual key block, which can become operated with pressure on the appropriate place of the indicator, for everyone of the represented keys of the key block, represented on the indicator, by the actuator a perceptible delimitation < RTI ID=3.2> und/oder< /RTI> a keyboard inscription, in particular also for the realization of a terminal for Sehbehinderte and/or. Blind one is helpfully actualrealized. For example it is conceivable, keyboard and inscription for seeing to be represented, while simultaneous is produced by the actuator an expenditure in Braille " Braille " underneath the represented key.

By suitable control (software), in order to come the impression of a real keyboard more near, a giving way knows and/or.

Engage the virtual key to be produced and it is even possible to simulate a sliding control in that a virtual key of the contact representing a controller and/or. pulling the key follows, whereby in

addition possibly. the surface of such a controller is produced in particular rau and handy. By the indicator according to invention the user receives an intuitive feedback, which grants a higher security in handling a contact-sensitive indicator to the user and which influence of disturbing noises < and; RTI ID=3.3> Lichtgegeben </RTI> heat minimized and/or. neutralized.

As the first coating indicator media, those are particularly suitable in accordance with the technology of the " electronic paper ", ?mikroge encased elektrophoretischen indicator " or " organic E< RTI ID=4.1> Lektro luminescence " ausgestaltet</RTI> are, since this out-arranges very thinly and as flexible film mechanical forces, which affect in particular punctually the foil surface, as them produce the actuator, gives way. The film is out-arranged in such a manner flexible that it returns to the starting situation before the mechanical application of force, as soon as the application of force is terminated.

An arrangement of the receptor as Lichtgitter, permits the indirect detecting of contacts, since such seizes scarcely over the first coating attached Lichtgitter only the place to a user for example with the finger the light of the grid interrupts, in order to affect a virtual key. The moreover one this arrangement has the advantage that the second coating from that is formed air, which is limited by the mechanisms realizing the Lichtgitter only, so that the actuator does not experience additional resistor for punctual mechanical manipulation and little driving power necessarily.

The arrangement of the actuator as matrix arrangement of electrical and/or magnetically propelled pins permits the production to a roughness and/or. Pavement grip of the virtual keys and is in particular suitable for the realization of the expenditure of a Braille particularly.

A matrix of perpendicularly to the indication stored movable pencils as receptor is suitably, over engaging and/or.

To simulate giving way on a depressing the key. Also seizing of a virtual sliding control is simple with this arrangement to realize, since for the determination of the sliding direction the condition of neighbouring pencils must be only examined.

Alternating of actuator matrix and the receptor matrix in the same level (coating) to arrange next to each other area saves pencils.

Still more favourably it is to be out-arranged the pencils in such a manner that it < both the actuator and receptor function; RTI ID=5.1> erfül </RTI> len. Thus < RTI ID=5.2> left; /RTI> itself also effective and space-saving kind the delimitation and/or. Produces inscription of a virtual key (drives out the pens), whereby (inside) it presses the sticks to the detecting of the contact made possible and on the other hand the giving way and/or. Engage. Besides is < by; RTI ID=5.3> Ortsübereinstimmung</RTI> pressure point determined by receptor and actuator function a more precise allocation of and represented virtual information possible.

Piezo-electric elements are particularly suitable for the drive and/or the detecting of contacts it, for example by microprocessors produced, voltages (signals) in pressure there and/or. Movement to convert directly and turned around by microprocessors, further-processable voltages (signals) can produce pressure in immediately.

Electromagnetic elements become, just as the piezo-electric elements, for the realization of Braille terminals, Braillezeile admits, and therefore easily to acquire.

A sensor mat as receptor to plan, has among other things the advantage that the sensor mat is favorable as mass product in the acquisition.

If the second coating is out-arranged as transparent sensor mat, which above the first coating to lie besides directly comes, that is < mechanical flexible; RTI ID=5.4> Anzeigemedium</RTI> protected there it no longer directly the contact by a user suspended is. The life, in the comparison to the sensor mat with higher (acquisition) costs of connected indicator medium is surely increased.

An embodiment of the invention is represented on the basis the only figure. This shows: Side view of the layer structure of one < RTI ID=6.1> berührungssensi</RTI> tiven indicator with tactile feedback.

In the figure one is < in three coating; RTI ID=6.2> S1, </RTI> < RTI ID=6.3> S2</RTI> and S3 arranged indicator in side view represented, whereby in the first coating < RTI ID=6.4> S1</RTI> a transparent, for flexible sensor mat to be appropriate comes.

This sensor mat is in such a manner out-arranged that it produces contacts detected and at least a first signal, which determines at least the place (cartesian coordinates) of the contact.

Directly above this first coating S1 the second coating S2 is arranged, which is formed by a flexible film, which is out-arranged after the technology of the so-called electronic paper.

By an electronic paper in the professional world a technology is understood, with which the advantages are united by flat screens and printer color on paper, by smallest color caps with at least two color approximately black and white on one < RTI ID=6.5> Papierfläche</RTI> show upward depending upon electrical loading in an individual place with the one or the other side. For the control of the electrical field necessary for it transistors are meant so-called plastics.

Alternative ones of the professional world well-known technologies are " organic < RTI ID=6.6> Electrical Lumineszenz</RTI> Films " or " micro-enclosed elektrophoretische displaying ", which likewise permits an arrangement as flexible very thin indicator media.

For the arrangement according to invention the use of this technology is meant those on a film, which is mechanical flexible and flexibly out-arranged, so that it can be manipulated punctually mechanical, in order to produce balancing on the surface of the film, itself after terminating the mechanical manipulation independently < RTI ID=7.1> zurückbilden.< /RTI>

31 Below the second coating < RTI ID=7.2> S2< /RTI> the third coating comes < RTI ID=7.3> S3< /RTI> to lie, the stored piezo-electric claimant as nylon or metal pin, movable by a surface covering matrix out perpendicularly to the foil surface, < RTI ID=7.4> out-arranged " Nop </RTI> < RTI ID=7.5> pen " Nl. < /RTI> Nm is formed.

32 The three coatings < RTI ID=7.6> S1, < /RTI> < RTI ID=7.7> S2 and S3< /RTI> it is arranged in such a manner with the fact that the piezo-electric claimant burls < RTI ID=7.8> NI.< /RTI> Nm the first two coatings < RTI ID=7.9> S1< /RTI> and S2 punctually mechanical to manipulate can, so that burls arranged through next to each other < RTI ID=7.10> NEVER. </RTI> Nm in a starting situation Tastaturbegrenzungungen and/oderbeschriftungen virtual key block on the surface of the second coating produced and there for ore branches are.

Here the inscription can be written in the Braille, to see so that seeing users the possibility to have a virtual keyboard represented by the indicator medium and its function, whereby they feel the keyboard delimitation < RTI ID=7.11> kön < /RTI> nen, and simultaneous sehbehinderte users the possibility < the keyboard function by from the burls; RTI ID=7.12> Never. < /RTI> Nm produced Braille for ore branches.

33 At least the second coating < RTI ID=7.13> S2< /RTI> and the third coating S3 are < with a control unit; RTI ID=7.14> P< /RTI> connected, which is in such a manner out-arranged that her in a starting situation, D. h. a condition did not take place into (still) an input via contact, for example virtual keyboard block and/or a virtual < RTI ID=7.15> Menüleiste< /RTI> by production at least a second signal, for the control of the burl matrix < RTI ID=8.1> Never. </RTI> < RTI ID=8.2> Nm, < /RTI> one realizes. The moreover one the control unit AP is in such a manner out-arranged that it produces the first signal produced due to a contact of the sensor mat at least a new second signal, whereby the contact in one < RTI ID=8.3> zulässi < /RTI> towards range, i.e. a range into a virtual control element is represented, to have taken place must.

34 The control unit < RTI ID=8.4> pP< /RTI> in addition in addition with the indicator is a steering unit connected or forms with it a unit, so that also control signals are produced for the production of operatingconditioned changes of the virtual control elements.

As alternative to the sensor mat also a Lichtgitter can lie to come in the second coating S2.

As well as Lichtgitter consist generally of two perpendicularly to each other arranged transmitter borders, those in each case several light rays emit opposite each transmitter border arranged receiver borders, which detects the light rays.

The light rays of the perpendicularly arranged transmitter borders cross and produce a Lichtgitter. During penetrating < RTI ID=8.5> Lichtgitters</RTI> on perpendicularly to each other the arranged are < RTI ID=8.6> Receiver borders, </RTI> being missing at least in each case a light ray detected, so that pairs of coordinates can be formed, with those one exactly identification of the penetration place takes place. The determined coordinates can then as the first signal to the control unit < RTI ID=8.7> pP</RTI> are led.

The Lichtgitter is in such a manner < above the first coating thereby; RTI ID=8.8> S1</RTI> arranged that by the burl matrix < RTI ID=8.9> NI.</RTI> N2 punctual projections of the indicator surface no light rays interrupt.



Claims of WO0227645

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Claims 1. Contact-sensitive indicator with tactile feedback ge marks a first coating by A) < RTI ID=9.1> S1, < /RTI> with a mechanical flexible < RTI ID=9.2> Indicator medium, < /RTI> b) a second coating S2 with at least one receptor, C) a third coating < RTI ID=9.3> S3< /RTI> with at least a controllable

Actuator, D) the second coating S2 is in such a manner arranged that that Receptor a contact in at least a subrange of the first coating < RTI ID=9.4> S1< /RTI> under production at least a first signal seized, e) the third coating < RTI ID=9.5> S3< /RTI> it is in such a manner arranged that the controllable actuator the first coating < RTI ID=9.6> S1< /RTI> at least in that

Subrange punctually mechanical manipulated, f) control equipment < RTI ID=9.7> pP, < /RTI> with the second coating < RTI ID=9.8> S2< /RTI> and third coating < RTI ID=9.9> S3< /RTI> in such a manner out-arranged and federations is that in a starting situation at least a second signal is produced for the control of the actuator, whereby on basis of the first signal mindes tens a changed second signal is produced.

2. Indicator according to claim < RTI ID=9.10> 1, < /RTI> characterised in that < RTI ID=9.11> Anzeigemedium< /RTI> one in accordance with the technology " elektroni paper ", ?micro-enclosed elektrophoretischen schen shows on " or " organic Elektro-Lumineszenz?, ausges taltete film is.

3. Indicator according to claim 1 or 2, characterised in that the receptor as " Lichtgitter " is out-arranged.

4. Indicator after one of the claims 1 to 3, thus gekenn draws that A) the actuator a first matrix arrangement movable gelager more ter electrical and/or magnetically propelled pencils < RTI ID=9.12> Ni. < /RTI> Nm is <, b); RTI ID=10.1> Stif of width unit Nj. N, < /RTI> perpendicularly to the surface first

Coating SI are more movable.

5. Indicator after one of the claims < RTI ID=10.2> 2< /RTI> until, thus gekenn it draws 4 that A) the receptor a second matrix arrangement movable ge of lagerter pencils < RTI ID=10.3> Never. Nm< /RTI> , b) the pencils is < RTI ID=10.4> N1. Nm< /RTI> perpendicularly to the surface first Coating < RTI ID=10.5> S1< /RTI> are more movable.

6. Indication according to claim 5, characterised in that the second coating S2 and third coating < RTI ID=10.6> S3< /RTI> a common

▲ top Coating form, whereby the pencils < RTI ID=10.7> NEVER. < /RTI> Nm of the first matrix arrangement and the pencils < RTI ID=10.8> NEVER. < /RTI> Nm of the second Matrixanordnung next to each other are arranged.

7. Indicator according to claim 6, characterised in that those Pencils < RTI ID=10.9> Ni.< /RTI> Nm as actuator and receptor at the same time are out-arranged.

8. Indication after one of the claims 4 to 6, thus gekenn draws that the pencils < RTI ID=10.10>

Ni.< /RTI> Nm of piezo-electric elements are.

9. Indication after one of the claims 4 to 6, thus gekenn draws that the pencils < RTI ID=10.11> NI.< /RTI> Nm electromagnetic Ele mente is.

10. Display after one of the preceding claims, characterised in that the second coating S2 a Sensormat of width unit is. II. Display according to claim 10, characterised in that A) the first coating < RTI ID=10.12> S1< /RTI> below the second coating S2 to lie, b) the second coating S2 transparent and flexible comes is.